

THE LATE JOHN LAWRENCE SMITH

THE following information relative to Dr. John Lawrence Smith of Louisville, U.S.A., who died on October 12, 1883, in his sixty-fifth year, is abstracted from a sketch of his life and work, prepared by his friend, Prof. Silliman, at the request of the American Academy of Sciences.

John Lawrence Smith was born near Charleston, South Carolina, on December 17, 1818. "Even as a child of four years, and before he could read," says his friend, Dr. Marvin, "he was familiar with the operations of simple arithmetic; at eight he was prepared for the study of algebra, and at thirteen was studying the calculus." At the age of seventeen (1836) he entered the University of Virginia, and for two years devoted himself to the study of chemistry, natural philosophy, and civil engineering. For twelve months after leaving the University he acted as assistant engineer on the Charleston and Cincinnati railroad, but relinquished the post with a view to the study of medicine. While still a student in Charleston he made known to chemists (1839) the use of potassium chromate as a reagent for distinguishing between the salts of barium and strontium; and in the same year he published a paper on a new method of making permanent artificial magnets by galvanism.

In 1840 Mr. Smith proceeded to his medical degree, submitting as a graduation thesis an essay upon the compound nature of nitrogen. His father being a well-to-do merchant, Mr. Smith was able to continue his medical studies; for this purpose he travelled to Europe, and spent his winters at Paris under Dumas, Orfila, Pouillet, Despretz, Becquerel, Dufrénoy, and Elie de Beaumont, and his summers at Giessen under Liebig. In 1842 appeared his elaborate paper on "The Composition and Products of Distillation of Spermaceti," probably the first extensive work in organic chemistry undertaken by an American chemist. In 1843 he began medical practice, though chemical research was more congenial to his taste; and, in fact, during the next four years, he found time to contribute important work towards the improvement of analytical methods in chemistry. At this time he also acted as assayer for the State of South Carolina, studying its marls, ores, and cotton-bearing soils. Able reports on these subjects led to his selection by the Secretary of the United States as professional adviser of the Sultan of Turkey in the matter of the introduction into that country of American methods for the culture of cotton. "Finding, on his arrival in Turkey, that an associate proposed to inaugurate the cultivation on a plan doomed to failure, he was about to return to America, when he received from the Turkish Government a commission to explore the mineral resources of the country. He entered at once, with his customary zeal and intelligence, upon the work, and in the four years of his residence in the Sultan's dominions, in spite of many vexatious restrictions, he opened up natural resources which have ever since added an important item to the revenues of the Porte. His memoir on emery (1850) was equally important, both from a scientific and economic stand-point. Before his observations 'On the Geology and Mineralogy of Emery,' made in Asia Minor, little was known of the mode of occurrence of this useful mineral. The island of Naxos had long been almost the only locality, and the supply from this source was limited and the price excessive, and no geologist had found an opportunity of studying the mineral associations of emery or its relations to corundum. Smith's sagacity as an observer, his originality in discussing new methods of examination, his patience and conscientious fidelity in executing his work, are all conspicuous to the student of this memoir. From the study of the mineralogical associations in which he found the emery of Asia Minor, he felt convinced that the search for like associations elsewhere would be rewarded

by the discovery of emery or corundum. With this view he addressed Prof. Silliman, requesting him to test the correctness of his observations upon known localities of corundum in the United States. The associate minerals were immediately found and reported. Later on, Smith had the opportunity of seeing the accuracy of his views demonstrated at the emery mine of Chester, Hampden County, Massachusetts, which Dr. Charles T. Jackson had discovered by use of the key of its associate minerals, as suggested by Smith, the locality having been before regarded only as an iron mine."

Weary of the life he led in Turkey, and irritated by the obstacles thrown by the Turkish officials in the way of any real mineralogical exploration of the country, Dr. Smith resigned his appointment in 1850, and returned to America. He married in 1852, and in the same year succeeded to the chemical chair in the University of Virginia, which he retained for one year; it was at this time that he published the method of determining the alkalies in silicates which is now in general use. From 1854 to 1866 he was Professor of Chemistry at Louisville, but finding the restraints of a professorship distasteful, he, in the latter year, resigned the chair, and afterwards devoted his scientific work almost wholly towards the investigation of the chemical nature of meteorites, publishing nearly fifty papers on that subject. Having been successful in collecting illustrations of no less than 250 falls, he was very anxious that the collection should be kept together, and with this view he negotiated its sale for \$2000. to Harvard College; the news of the conclusion of the purchase only reached him on the last day of his life. Since his death the sum received from Harvard College has been presented by his widow to the American Academy of Sciences for the institution of a "J. Lawrence Smith medal for researches on meteoric bodies."

"Dr. Smith's personal character possessed a charm which won all who came within the sunshine of his genial nature. His sturdy manliness and integrity was combined with an almost feminine gentleness. During the years of the Civil War, while his affiliations and life-long associations were inseparably united with his native south, he deplored the sad conflict with a spirit bowed as under a personal sorrow; but none heard a word from him which partook of bitterness or animosity, and no shadow passed across the path of his old friendships."

Dr. Smith had no children, but he founded and amply endowed an orphan home in Louisville, his adopted city.

For the last two or three years he was in delicate health, owing to a chronic affection of the liver; and on August 1, 1883, a severe attack of the disease compelled him to take to his bed, from which he never rose again. Without acute suffering he passed peacefully away on Friday, October 12, at three in the afternoon.

By his direction, his funeral was of the most simple character and without an eulogy. His life closed as he had lived, peacefully, with uncomplaining endurance of suffering. His last words were: "Life has been very sweet to me; it comforts me. How I pity those to whom memory brings no pleasure!"

THE NORTH AFGHAN BORDER TRIBES

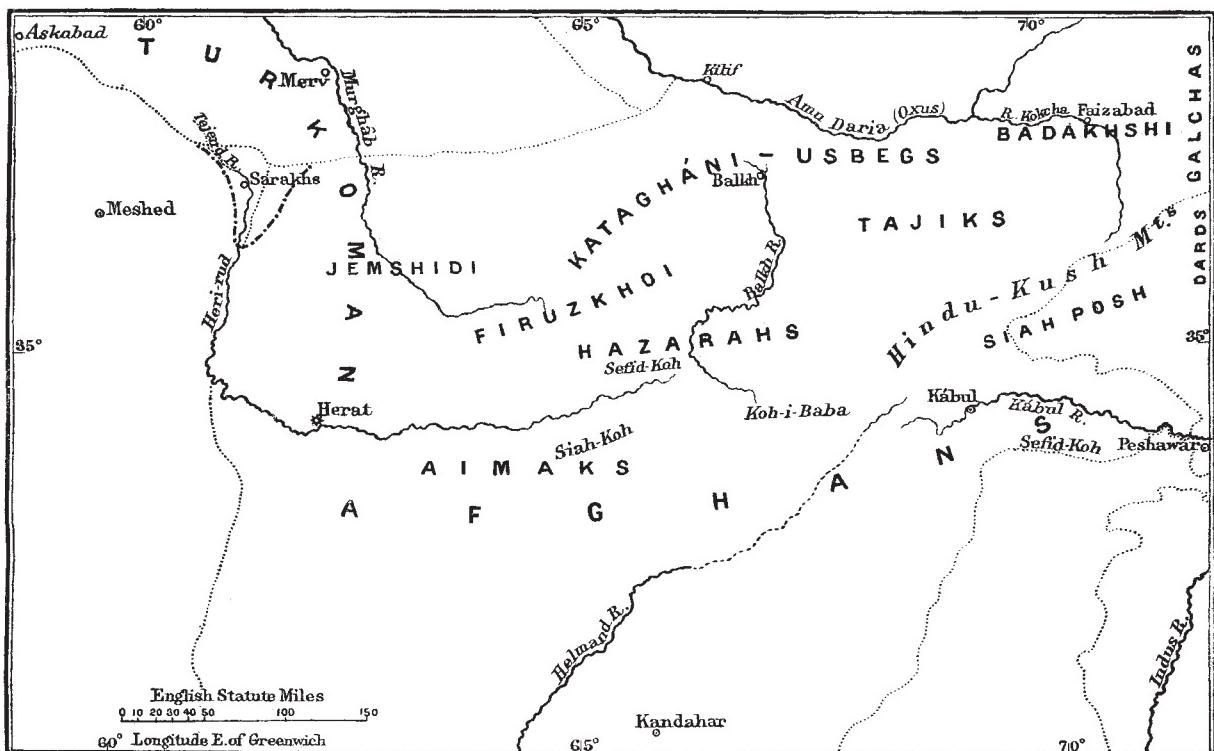
IN a paper on "Afghan Ethnology," published in NATURE, January 22, 1880, a comprehensive survey was given by this writer of all the varied racial elements in Afghanistan. Here it is proposed to deal exclusively and somewhat more fully with the northern peoples lying along and about the new boundary line proposed to be laid down between the now conterminous Anglo-Indian and Russian empires. Were the importance of ethnological studies understood or recognised by British statesmen, it would be needless to insist upon an accurate knowledge of the tribal relations in this border-land

before determining the future line of demarcation between the two States. As matters stand, nothing can be done beyond supplying a few authentic data, which, if not too late, may possibly help our Boundary Commissioners to appreciate the gravity of the situation.

Politicians of eminence have in recent times spoken flippantly of a great and consolidated Afghan people, one in origin, speech, usages, national aspirations, in friendly alliance with the British *rāj*, destined to constitute a formidable bulwark of the Indian Empire against the further encroachments of the northern Colossus. Those who have conjured up this pleasant vision, and shaped their policy in the belief of its realisation in our days, are doubtless well meaning persons; but they are not practical men of business, dwellers rather in dreamland than sober inhabitants of this planet. Afghanistan is not the home of one, but of many peoples, differing widely in race, language, customs, in some cases even in religion and

political institutions; nor are the materials at hand by which these heterogeneous fragments could be welded into a single body politic for many generations to come.

A mere glance at the accompanying sketch map will suffice to show that the Afghan race proper, since the death of Nadir Shah (1747) heir to the former Persian masters of the land, nowhere even approaches the northern frontiers, except in the Herat district towards the north-west. Notwithstanding their great elevation, the mountain ranges stretching from the Hindu-Kush, through the Koh-i-Baba and parallel Safed-Koh and Siah-Koh chains westwards to Khorásán, constitute neither an ethnical, a political, nor even a complete physical parting line between the Afghan plateau and the Turkestan lowlands. The Hindu-Kush itself doubtless forms a distinct "divide" for the waters flowing north to the Oxus, south to the Indus basin. Further west, also, all the head streams of the Murgh-áb, or River of Merv, have their



sources on the northern slope of the Safed-Koh, probably the Paropamisus of the ancients. But here the mountain barrier is completely pierced by the Heri-rud, which takes its rise south of the Koh-i-Baba, and, after flowing a long way west between the Safed-Koh and the Siah-Koh, trends northwards beyond Herat to the Turkestan steppe. Politically, also, the rampart is broken all along the line, both slopes from Kashmir to Persia being claimed and hitherto recognised as integral parts of Afghan territory. Thus the whole of Afghan Turkestan, of Badakhshán, and the more remote north-eastern provinces of Wakhán and Shugnán, are comprised within the Aralo-Caspian hydrographic system.

A clear idea of these geographical features is necessary to a right understanding of the racial conditions in this extremely intricate ethnological region. From before the dawn of history constituting a natural parting line between Irán and Turán, it has, nevertheless, been so repeatedly crossed and re-crossed by the contending

floods of migration and conquest, advancing now from the north, now from the south, that throughout the historic period it appears to have always been occupied by peoples both of Mongolic and of Caucasic stock. At present the former are found mainly in the western section, between the meridians of Kabul and Herat, the latter thence eastwards to the Pamir and Indus, each on both slopes of the Iranian escarpment between the 34° and 40° parallels. Of the two the Caucasic appears to be the aboriginal, the Mongolic the intruding, element; and by many ethnologists the upland valleys of the "Indian Caucasus" are regarded, if not as the cradle, at least as the centre of dispersion of the Aryan branch of the Caucasic group. Hence, those members of the Aryan family still occupying both slopes of the Hindu-Kush are supposed to be found, so to say, *in situ*, that is, in undisturbed possession of their primeval homes from the first. Such are, on the south side, the so-called SIAH-POSH, or SIAH-POSHER KAFIRS ("Black-clad Infidels"), and further

east the numerous communities often collectively known as DARDS; on the north side the BADAKHSHI, WAKHI, and SHUGNÁNI, to whom, with the other kindred highlanders of Roshán, Darwáz, and Karateghin, beyond the Oxus, Ch. de Ujfalvy has applied the collective term GALCHA. That all are fundamentally of one stock there can be no doubt, although much uncertainty prevails regarding their position in the Aryan family.

The northern group (Badakhshi, Wakhi, Shugnáni) have long been brought within the sphere of Iranian culture. Some are Parsiván, that is, Parsi-zabán, or "Persian-tongued"; others, especially in Wakhan, still retain much of their primitive speech, which appears to be intermediate between the Indic and Iranic members of the Aryan family. But all are at least nominal Mohammedans of the Sunni sect, and recognise the supremacy of the Amir of Kábul. In view of future political intrigue on this extreme north-east frontier, it will be desirable to bear in mind the close affinity and common sympathies of all these communities on both sides of the Upper Oxus.

Even more interesting, and in some respects more important, is the southern group of Siah-Posh Kafirs, who occupy the upland valleys between Kohistán and the Swati district, and even visit the northern pastures west of the Dora Pass, crossing the Hindu-Kush at an altitude of some 16,000 feet. In these mountain fastnesses they have hitherto succeeded in preserving intact not only their primitive speech, usages, and religion, but even their political independence. Although included within the limits of the Amir's possessions, no Afghan ventures to penetrate into their territory, which till quite recently was almost a *terra incognita*. By Major Tanner, and the few other Europeans by whom they have been visited, they are described as of a pure Caucasian type, with regular features, blue and dark eyes, hair varying from brown to black, and altogether the most European in appearance of all Asiatic peoples. With the British rulers of India they claim kindred, trace their descent from Alexander the Great, differ from other Asiatics in the use of chairs and tables, and speak a pure Aryan dialect, showing marked affinities to Sanskrit. Some few in the extreme south and west have become assimilated in speech and religion to their Afghan neighbours, and these Safi and Nemchi, as they are called, serve as the medium of communication between the two races. For obvious reasons the masters of India should cultivate the friendship and alliance of the Siah-Posh highlanders, who, from the name of their most powerful *gali*, or tribe, sometimes take the collective name of Kamoji.

The south-western slopes of the Hindu-Kush north of Kábul are held by several little known tribes vaguely known as KOHISTÁNI, or "Hill men." They occupy the whole district between Kafiristán and the Koh-i-Baba. They are mainly Tajiks, that is, Iranians, probably descended of Persian settlers in pre-Mohammedan times, and still speak a rude Persian dialect. Although now Mohammedans of the Sunni sect, they appear to be an unruly people, owing a reluctant allegiance to the Amir, in this and some other respects differing from the other Tajiks found dispersed in settled communities elsewhere in Afghanistan and throughout the whole of Central Asia. The name, referred to the root *táj* = *crown*, is supposed to mean "crowned," indicating the imperial race that once held sway from the Bosphorus to the Indus. But the sceptre has long passed from Irán to Turán even in Persia itself, where the reigning dynasty belongs to the Qajár tribe, of Turkoman stock.

As already stated, both slopes of the North Afghan highlands are in almost exclusive possession of Mongolic peoples from the Koh-i-Baba to Herat, east and west, and from Afghan Turkistan southwards to the Ghor uplands. Here both branches of the Mongolo-Tatar group are represented, the Mongols proper by the HAZARAHS and the AIMAKS, the Tatars by the TURKOMANS and the

KATAGHÁNI USBEGS. With the Hazarahs are sometimes grouped the JEMSHÍDIS and FIRUZ-KHOI of the province of Herat. But both of these numerous communities appear to be fundamentally of Iranian stock, although the type has to some extent been modified by contact with the surrounding Mongolo-Tatar tribes.

Thus it appears that, as above remarked, the Afghans proper nowhere occupy any territory along their northern frontier, but, except at Herat, have everywhere been driven into the interior of the plateau by the intruding Central Asiatic races. It is further to be noted that although they hold the Usbegs of the Tirband-i-Turkestán escarpment and of the Turkestán lowlands in military subjection, they have hitherto failed to reduce either the Aimaks of the Ghor district or the Hazarahs of the Koh-i-Baba and Safed-Koh ranges. The direct route from Herat to Kábul through this region has not only never yet been traversed by any European explorer, but is absolutely inaccessible to the Afghans themselves. Hence it is that the military and trade route between these two points is deflected a long way southwards to the Helmand basin and to Kandahar, whence it laboriously creeps up through the Ghazni highlands to the Kábul valley.¹ Hence also the vast strategic importance of such places as Kandahar and Girishk on the Helmand, which depends, not, as is generally supposed, so much on the lie of the land, as on the ethnical conditions of its inhabitants. The future masters of the Aimak and Hazarah tribes will not only secure the rich prize of the Ghor region, with its untouched mines of gold, silver, copper, lead, iron, coal, sulphur, rubies, and emeralds, but will also command the direct and natural route from Herat to the Indus, *via* Kábul and Pesháwar.

Meantime, these Aimaks and Hazarahs, neglected by our statesmen, continue to interest our men of science alone. Their flat features, tawny complexion, scant beard, oblique eyes, and prominent zygomatic arches, betray their common Mongolic descent, while the somewhat rude Persian dialect generally spoken by both implies long contact in their new homes with Iranian culture. Both are also Mohammedans; the Aimaks of the Sunni, the Hazarahs of the Shiáh sect, in this respect differing from all other Mongolian tribes, who are exclusively Buddhists. Another proof of Persian influence is the settled life of the Hazarahs,² who have long ceased to be nomads, and now occupy permanent villages of small thatched houses. Of late years they have begun to migrate towards India, where they find employment on the public works.

The Aimaks, or Char Aimaks, that is "Four Hordes," so named from their four main divisions, occupy, besides the Ghor country, extensive tracts on the northern slope of the border ranges, on the hills encircling Herat, and beyond the frontier in Khorásán. Some communities in the Herat district have preserved their mother-tongue, and their chief tribe even still bears the Mongol name of Kipchak. They also retain the old *urdú*, or tents made of felt or skins, and usually grouped round a central tower or stronghold occupied by the chief. They are described as altogether more savage and ferocious than their Hazarah neighbours, and are even said to drink the blood of the slain in battle (Elphinstone).

With the fall of Merv all the hitherto independent Turkoman tribes passed under the sceptre of the "White Czar," except the SARIKS and the SALORS. Soon after that event the Sariks of the Merv oasis gave in their submission to the number of about 10,000 families. When that district was invaded in 1860 by the Tekkés, the Salors, its original masters, withdrew higher up the Murgháb valley, where they are still found within and about the Afghan frontier, on the route between Merv and

¹ The direct route is little over 360 miles, the detour by Kandahar about 550.

² Probably so named from the Persian *hazár* = a thousand, in allusion to their numerous tribal subdivisions.

Herat. They do not recognise the authority of the Amir of Kábul, and should the Czar, who is about to assume the title of "Emperor of Central Asia," claim the allegiance of this outlying Central Asiatic tribe, here will be a fruitful source of future complications. Their submission would at once advance the Russian frontier far into Afghan territory and up the Murgháb valley to within easy distance of Herat from the north. The route in this direction is well known, and constantly traversed by traders from Khiva, Bokhara, and Samarkand. It appears to present no greater difficulties than the more westerly route crossing the Barkhut ridge recently surveyed by Lessar.

There remain to be mentioned the KATAGHÁNI USBEGS, who form the bulk of the population in Afghan Turkestán. They belong to the same ethnical group as the Usbegs of the Khanates, and have even some settlements in Bokhara beyond the Oxus. They are mostly agriculturists and traders, Sunnite Mohammedans of pure Turki speech, and bear with reluctance the hard yoke of their Afghan masters. Their sympathies are entirely with their northern kinsmen, and as the country (Kunduz, Balkh, Maimene) belongs geographically to the Aralo-Caspian basin, it is difficult to see how further rectifications of frontier can ultimately be prevented in this direction. Exponents of advanced public opinion in Russia already openly claim the whole of this region to the crest of the Hindu-Kush as properly belonging to the ruler of Central Asia, and their arguments are largely based on ethnological grounds.

Table of the North Afghan Border Tribes

CAUCASIC STOCK			
Tribe	Locality	Population ¹	
Gatchas	Siah-Posh ...	Kafiristán ...	150,000
	Badakhshi ...	Badakhshán ...	160,000
	Wakhi ...	Wakhán ...	3,000
	Shugnáni ...	Shugnán ...	25,000
Iranians	Kohistáni ...	Kohistán ...	?
	Firuz-Khoi ...	Prov. Herat, Murgháb Valley ...	30,000 tents
	Jemshidi ...	Prov. Herat, Khushk Valley ...	12,000 families
	Tajiks ...	Herat, Balkh, &c.	200,000 ?
Afghans	Herat ...	Herat ...	100,000 ?
MONGOLIC STOCK			
Latars Mongols	Hazarahs ...	Házaráját ...	300,000
		Koh-i-Baba, Safed-Koh ...	350,000
	Aimaks ...	Ghor, Herat, Khorásán ...	30,000
	Salor Turkomans	About Martshag, Murgháb Valley ...	600,000
Katagháni Usbegs	Afghan Turkestán, Bokhara ...		

A. H. KEANE

ANTHROPOMETRIC PER-CENTILES

I SEND the following Table, partly to exemplify what I trust will be found a convenient development of a statistical method that I have long advocated, and partly for its intrinsic value, whatever that may be. It will at all events interest those of the 9337 persons measured in my Anthropometric Laboratory at the late International Health Exhibition, who may wish to discover their rank among the rest.

Its meaning is plain, and will be understood by the help of a single example, for which I will take the line referring to Strength of Squeeze among males. We see that a discussion was made of 519 measurements in that respect, of men whose ages ranged between 23 and 26; that 95 per cent. of them were able to exert a squeeze with their strongest hand (the squeeze was measured by

¹ Population mostly conjectural.

a spring dynamometer) that surpassed 67 lbs. of pressure; that 90 per cent. could exert one that surpassed 71; 80 per cent. one that surpassed 76; and so on. The value which 50 per cent. exceeded, and 50 per cent. fell short of, is the Median Value, or the 50th per-centile, and this is practically the same as the Mean Value; its amount is 85 lbs. This line of the Table consequently presents an exact and very complete account of the distribution of strength in one respect among the middle 90 per cent. of any group of males of the tabular ages similar to those who were measured at the laboratory. The 5 per cent. lowest and the 5 per cent. highest cannot be derived directly from it, but their values may be approximately inferred from the run of the tabular figures, supplemented by such deductions as the Law of Error may encourage us to draw. Those who wish to apply this law will note that the probable error is half the difference between the 25th and the 75th per-centile, which can easily be found by interpolation, and they will draw the per-centiles that correspond respectively to the median value minus twice, three times, and three-and-a-half times the probable error, at the graduations 87, 24, 08, and those that correspond to the median value plus those amounts, at the graduations 91.3, 97.6, and 99.2. The Table is a mere statement of observed fact; there is no theory whatever involved in its construction, beyond simple interpolations between values that differ little from one another and which have been found to run in very regular series.

It may be used in many ways. Suppose, for example, that a man of the tabular age, viz. above 23 and under 26, and who could exert a squeeze of 80 lbs., desired to know his rank among the rest, the Table tells him at once that his strength in this respect certainly exceeds that of 30 per cent. of those who were measured, because if it had been only 79 lbs. it would have done so. It also tells him that his strength does not exceed that of 40 per cent. of the rest, since it would have required a pressure of 82 lbs. to have done this. He therefore ranks between the 30th and the 40th per-centile, and a very simple mental sum in proportion shows his place to be about the 33rd or 34th in a class of 100.

The Table exhibits in a very striking way the differences between the two sexes. The 5th male per-centile of strength of squeeze is equal to the 90th female per-centile, which is nearly but not quite the same as saying that the man who ranks 5th from the bottom of a class of 100 males would rank 10th from the top in a class of 100 females. The small difference between the two forms of expression will be explained further on. If the male per-centiles of strength of squeeze are plotted on ruled paper, beginning with the lowest, and if the female per-centiles are plotted on the same paper, beginning with the highest, the curves joining their respective tops will be found to intersect at the 7th per-centile, which is the value that 7 of the females and 93 of the males just surpass. Therefore, if we wished to select the 100 strongest individuals out of two groups, one consisting of 100 males chosen at random, and the other of 100 females, we should take the 100 males and draft out the 7 weakest of them, and draft in the 7 strongest females. Very powerful women exist, but happily perhaps for the repose of the other sex, such gifted women are rare. Out of 1657 adult females of various ages measured at the laboratory, the strongest could only exert a squeeze of 86 lbs. or about that of a medium man. The population of England hardly contains enough material to form even a few regiments of efficient Amazons.

The various measurements of males surpass those of females in very different degrees, but in nearly every particular. A convenient way of comparing them in each case is that which I have just adopted, of finding the per-centile which has the same value when reckoned from the lower end of the male series, and from the higher end of the female series. When this has been done, the position of the